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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,201	11/04/2003	Anatoliy Savchenkov	06618-923001	7116

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EXAMINER

PETKOVSEK, DANIEL J

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 02/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/702,201

Applicant(s)

SAVCHENKOV ET AL.

Examiner

Daniel J Petkovsek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on application filed November 4, 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on November 4, 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/4/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This application is a CIP of 10/441,946, filed May 19, 2003, which claims benefit of 60/381,588, filed May 17, 2002.

Information Disclosure Statement

1. The prior art documents submitted by Applicant in the Information Disclosure Statements filed on August 4, 2004, have been considered and made of record (note attached copy of forms PTO-1449).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 4-7, 10-18, and 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Vahala et al. U.S.P. No. 6,580,851.

Vahala et al. U.S.P. No. 6,580,851 teaches (Fig. 7, **see in particular column 5, lines 6-63**) a device (and inherent method of same) comprising: first 701 and second 702 optical resonators each configured to support whispering gallery modes, wherein said first 701 and second 702 optical resonators are optically coupled to allow for light coupling from one resonator to another, in possibly different modes, and wherein at least one of the first 701 or second 702 optical resonators are tunable in response to a control signal (see column 5, lines 55-63) to change a desired property of the resonator(s).

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Regarding claims 2, 11, and 21, an electro-optic material can be used for the resonator with an electrical control. Regarding claims 12 and 13, up to N resonators can be used in the optical device.

Regarding claim 4, the resonator can include silica. Regarding claim 5, coupling occurs evanescently. Regarding claims 6 and 7, fiber waveguides are using in the coupling device.

Regarding claim 10, all of the resonators can be tunable in response to control signals.

Regarding claims 14-17, see column 3, lines 31-34, and column 5, lines 33-36 for the shaping including at least part spheroidal and disc shapes.

Regarding claims 18, 22 and 23, electro-optic materials can also be radiation sensitive, and Vahala et al. '581 teaches the tuning of these optical resonators by **electrical control or optical control** (heat/exposure by laser). Lasers have certain sensitizing wavelengths. See column 5, lines 15-27.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 8, 9, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vahala et al. U.S.P. No. 6,580,851, and further in view of Vahala et al. US 2002/0044739 A1.

Vahala et al. U.S.P. No. 6,580,851 teaches (Fig. 7, **see in particular column 5, lines 6-63**) a device (and inherent method of same) comprising: first 701 and second 702 optical resonators each configured to support whispering gallery modes, wherein said first 701 and

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second 702 optical resonators are optically coupled to allow for light coupling from one resonator to another, in possibly different modes, and wherein at least one of the first 701 or second 702 optical resonators are tunable in response to a control signal (see column 5, lines 55-63) to change a desired property of the resonator(s).

Vahala et al. '851 does not explicitly teach using germano silicate materials that are exposed to radiation.

Vahala et al. US 2002/0044739 A1 teaches (ABS, Figs. 1A, 4, 9A, [0123]-[0126], [0129]-[0132]) a device (and method of fabricating same) comprising: an optical resonator 100 configured to support whispering gallery modes and formed of a UV-exposed germano-silicate material which has an index of refraction different from an index of refraction of an identical germano-silicate material which has not been exposed to the UV radiation (see [0123] in particular for selective radiation of the material to form the resonator).

Since Vahala et al. '851 and Vahala et al. '739 are both from the same field of endeavor, the purpose of using components such as germano silicate to be radiated (Vahala et al. '739) would have been recognized in the pertinent art of Vahala et al. '851.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use different components to be radiated, to improve the overall utility and efficiency of the optical device by increasing the breadth of materials to be used.

Regarding claim 3, although not explicitly disclosing lithium niobate crystal as the electro-optic material of the resonator, lithium niobate is well known in the art for electro-optic materials, in particular for use in resonator structures. It would have been obvious to a person

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having ordinary skill in the art at the time the invention was made to use lithium niobate for the electro-optic material as disclosed for the purpose of improving optical resonation capabilities.

Using lithium niobate for modulation purposes is also referenced by Vahala et al. '739.

Regarding claims 8 and 9, although the art of Vahala et al. '851 does not explicitly discuss using prisms or photonic gap structures coupled to the sequential optical resonators, these structures are well known coupling mechanisms in the art. A person having ordinary skill in the art at the time the invention was made would have recognized using photonic gap structures (for improving optical coupling efficiency) or prisms (for redirecting optical signals at different angles) to increase capabilities of the device.

Inventorship

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, with respect to the state of the art of plural optical resonators in optical devices:

PTO-892 form references B-E.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J Petkovsek whose telephone number is (571) 272-2355.

The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Daniel Petkovsek
January 28, 2005


AKM ENAYET ULLAH
PRIMARY EXAMINER